IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Heinz Hofmann, et al.	**Examiner:**	Jeffrey L. Gellner
Serial No.:	10/714,800	**Art Unit:**	3643
Filed:	November 17, 2003	**Docket:**	15550Z
For:	PROCESS FOR THE PRODUCTION OF PRESSED INSENSITIVE EXPLOSIVE MIXTURES	**Dated:**	March 20, 2008

Confirmation No.: 2932

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANTS' BRIEF ON APPEAL

Sir:

In connection with appellants' Notice of Appeal filed December 20, 2007, please consider this Brief on Appeal for submission of record in the above-identified patent application.

CERTIFICATE OF ELECTRONIC FILING

I hereby certify that this correspondence is being deposited with the United States Patent & Trademark Office via Electronic Filing through the United States Patent and Trademark Office e-business website.

Dated: March 20, 2008

Leslie S. Szivos, Ph.D.

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(i) Real Party in Interest

The real party in interest of the application on appeal is the assignee, Diehl Munitionssysteme GmbH & Co. KG. See recorded Assignment dated June 21, 2004 at Reel 015493/Frame 0971.

(ii) Related Appeals and Interferences

There are no prior or pending appeals, interferences or judicial proceedings known to appellants, appellants' legal representative or assignee which may be related to, directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

(iii) Status of Claims

Claim 1 has been finally rejected.

Claim 2 has been cancelled.

Claims 3-7 have been finally rejected.

Claims 8-9 are withdrawn as being directed to a non-elected species.

Claims 10-13 have been finally rejected.

Claims 1, 3-7 and 10-13 are the subject of the present appeal.

(iv) Status of Amendments

The Response under 37 C.F.R. § 1.111, filed July 5, 2007, has been entered. No Response to the Final Office Action dated September 25, 2007 was filed. A Notice of Appeal dated December 20, 2007 was filed by the appellants listing Claims 1, 3-7 and 10-13 as the claims being appealed. Claims 1, 3-7 and 10-13, on appeal, are thus as they appear in the Listing of Claims within appellants' Response dated July 5, 2007.

(v) Summary of Claimed Subject Matter

Independent Claim 1, on appeal, is directed a process for producing an insensitive explosive mixture comprising depositing sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in an amount of less than 15 % by weight onto secondary explosive crystals to form a coating of said TATB on said secondary explosive crystals which binds said secondary explosive crystals. Support for this claim is provided in the specification at page 1, within the paragraph under the heading "Field of the Invention", page 3, lines 3-12, page 4, lines 14-18 and lines 28-30, page 5, lines 13-19 and lines 25-27, page 6, lines 5-11, and page 7, lines 1-3 and lines 11-2 of the originally filed specification.

Dependent Claim 3, on appeal, is directed a process wherein the secondary explosive crystals are selected from the group consisting of cyclotrimethylenetrinitramine (RDX), cyclotetramethylenetetranitramine (HMX), CL-20 (2,4,6,8,10,12-hexanitrohexaazaisowurzitane, HNIW), PETN (pentaerythritoltetranitrate) and combinations thereof. Support for this claim is provided at page 5, lines 25-29 of the originally filed specification.

Dependent Claim 4, on appeal, is directed to a process wherein the secondary explosive crystals are HMX crystals. Support for this claim is provided at page 5, lines 29-30.

Dependent Claim 5, on appeal, is directed to a process wherein the secondary explosive crystals are in an ammonia solution. Support for this claim is provided at page 6, lines 9-11 of the originally filed application.

Dependent Claim 6, on appeal, is directed to a process wherein the sonochemically aminated TATB is synthesized from 1,3,5-trichloro-2,4,6-trinitrobenzene

(TCTNB) by amination with NH_4OH under the influence of ultrasonic irradiation. Support for this claim is provided at page 6, lines 9-11 of the originally filed specification.

Dependent Claim 7, on appeal, is directed to a process wherein the sonochemically aminated TATB is produced by dropping a solution of trichlorotrianitrobenzene (TCTNB) in toluene into an ammonia solution that is immiscible with the solution of TCTNB in toluene and reacting the same in the presence of an ultrasonic source. Support for this claim is found at page 6, lines 13-15 of the originally filed application.

Dependent Claims 8 and 9 are withdrawn as being directed to a non-elected species. Rejoinder of Claims 8 and 9 might be possible provided that generic Claim 1, on appeal, is held to be allowable.

Dependent Claim 10, on appeal, is directed to a process further comprising adding an additional binder to said depositing step. Support for this claim is provided at page 5, lines 15-18 of the originally filed application.

Dependent Claim 11, on appeal, is directed to a process wherein the additional binder comprises a polyacrylic elastomer, a phthalate, calcium stearate, or fumed silica. Support for this claim is provided at page 5, lines 15-18 of the originally filed application.

Dependent Claim 12, on appeal, is directed to a process wherein said sonochemically aminated TATB has a mean particle diameter of 6 to 8 μm. Support for this claim is provided at page 6, lines 6-8 of the originally filed application.

Dependent Claim 13, on appeal, is directed to a process wherein said sonochemical aminated TATB has a mean particle diameter of less than 1 μm. Support for this claim is provided at page 6, lines 6-8 of the originally filed application.

Further support for the above claims can be found within Examples 1-4 of the originally filed application.

(vi) Grounds of Rejection to be Reviewed on Appeal

(I) Whether Claims 1, 3-7, 10, 12 and 13, on appeal, are patentable, under 35 U.S.C. § 103(a) over the combined disclosures of U.S. Patent No. 6,345,577 to Cramer et al. ("Cramer et al."), U.S. Patent No. 4,770,728 to Berg et al. ("Berg et al.") and U.S. Patent No. 6,547,899 to Lee et al. ("Lee et al.")?

(III) Whether Claim 11, on appeal, is patentable, under 35 U.S.C. § 103(a) over the combined disclosures of Cramer et al., Berg et al., Lee et al. and U.S. Patent No. 6,425,966 to Highsmith et al. ("Highsmith et al.")?

(vii) Arguments

(I) Claims 1, 3-7, 10, 12 and 13, on appeal, are patentable, under 35 U.S.C. § 103(a) over the combined disclosures of Cramer et al., Berg et al. and Lee et al.

Appellants respectfully submit that Claims 1, 3-7, 10, 12 and 13, on appeal, are not rendered obvious by the combined disclosures of Cramer et al., Berg et al. and Lee et al. Specifically, the combined disclosures of applied references do not teach or suggest a process for producing an insensitive explosive mixture comprising *depositing sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in an amount of less than 15 % by weight onto secondary explosive crystals to form a coating of said TATB on said secondary explosive crystals which binds said secondary explosive crystals*. In the claimed invention, sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB), when used in the claimed weight percent, coats the secondary explosive crystals and provides a means of binding a plurality of secondary explosive crystals together.

That is, appellants have analyzed the polarities and molecular properties of high explosives such as, for example, RDX (known variously as cyclonite, cyclotrimethylenetrinitramine and 1,3,5-trinitro-1,3,5-triazacyclooctane) and HMX (know variously as cyclotetramethylenetetranitramine, and 1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane), in relation to TATB, and have determined that there is a high polarity bonding between the high energetic explosives and TATB which can avoid the addition of inert binders. Moreover, this data suggested the possibility of employing a relatively low percent weight of sonochemically aminated TATB because of its inherent coating capability, especially when it is mixed with HMX. Hence, the appellants have determined that a low percent weight of

sonochemically aminated TATB of less than 15% can be used to reduce the sensitivity significantly of a HMX mixture below the threshold of "less sensitive" requirements.

Quicklook tests by the appellants confirmed the above analyses, especially for HMX coarse grains and TATB having a mean particle diameter of about 6 to about 8 μm, showed an excellent adhesive behavior during dry or wet mixing. Further analysis of pressability and shock sensitivity of small pellets using different HMX classes of quality B following the rules of harmonic contents of the different grain size distributions for maximum crystal density packages led to pellet densities of 1.92 g/cm^2 which meets shock insensitivity criteria's already at a 5% weight content and the status "less sensitive" of STANAG 4170 between 10% and 15% weight content of this type of TATB only, without presence of any binder.

Cramer et al. provides propellants compositions such as, for example, a binder component and a nitramine, that are coated with an energetic deterrent coating (including, for example, TATB) which reduces the burning rate at the surface of the propellant grain and causes the propellant to burn. See col. 2, lines 3-67.

Despite the above, Cramer et al. is defective in that the applied reference does not teach or suggest that the disclosed energetic deterrent coating, which may include TATB, but not *sonochemically aminated TATB,* can be used to bind the propellant grains together. Instead, a separate binder (see col. 2, lines 27-37) is used in Cramer et al. to bind the propellant grains together. These binders are present in the initial propellant mixture hence the binding of the propellant grains is conducted prior to the application of the energetic deterrent. As such, Cramer et al. does not contemplate the addition of TATB as a binder for binding the propellant grains together. Instead, TATB and other energetic compounds disclosed in Cramer et al. are

used as a coating material that induces a slow burning property to a propellant composition that includes a propellant such as nitramine and a binder component.

In addition to the above, appellants find no disclosure within Cramer et al. in which *sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB)*, when used in a proper weight percent, can be used to coat the secondary explosive crystals **and** provide a means of binding a plurality of secondary explosive crystals together.

Berg et al. which provides a method for coating high energy explosive crystals does not alleviate the above defects in Cramer et al. since Berg et al. comprises conventional binders, but not *sonochemically aminated TATB,* that can be used as part of the coating composition which coating composition can be applied to high energy explosive crystals. Appellants find no disclosure within Berg et al. in which *sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB)*, when used in a proper weight percent, can be used to coat the secondary explosive crystals and provide a means of binding a plurality of secondary explosive crystals together.

Lee et al. provides a method for producing fine grained TATB powders utilizing a single-step sonochemical amination process. The prior art sonochemically aminated TATB powders are used in Lee et al. as an insensitive explosive. Despite the above disclosures, Lee et al. does not alleviate the above defect in Cramer et al and Berg et al. since the applied tertiary reference also fails to teach or suggest appellants' claimed process for producing an insensitive explosive mixture wherein a *coating of sonochemically aminated TATB* is formed on secondary explosive crystals which binds the secondary explosive crystals. That is, the applied reference, does not teach or suggest a step of depositing the same onto explosive crystals such that a coating is formed on the crystals which binds the crystals together.

Appellants observe that Lee et al. fails to recognize that the TATB powder mentioned therein could be applied as a coating and that the use of the disclosed method would provide binder properties to a coating composition. There is no disclosure in Lee et al. that would lead one skilled in the art to try to use the disclosed method therein for providing a coating that binds secondary explosive crystals together as presently claimed. Appellants further observe that one skilled in the art would not consider to use the process of Lee et al. to provide a coating composition to a secondary explosive crystal which not only coats, but binds the secondary explosive crystals together since neither Lee et al., Cramer et al. nor Lee et al. teach or suggest that the *coating composition can itself have binding properties*.

Appellants thus submit that the combined disclosures of Cramer et al., Berg et al. and Lee et al. do not render the claimed invention recited in Claims 1, 3-7, 10 12 and 13, on appeal, obvious since none of the applied references teach or suggest that sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB), when used in a proper weight percent, can be used to coat the secondary explosive crystals and provide a means of binding a plurality of secondary explosive crystals together.

Hence, the rejection of Claims 1, 3-7, 10, 12 and 13, on appeal, under 35 U.S.C. § 103 has been obviated. Reconsideration and withdrawal thereof are respectfully requested.

The § 103 rejection also fails because there is no motivation in the applied references which suggest modifying the methods to include the various processing steps and elements recited in the Claims 1, 3-7, 10, 12 and 13 of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the

desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

Appellants again submit that the combined disclosures of Cramer et al., Berg et al. and Lee et al. do not render the claimed invention as recited in Claims 1, 3-7, 10, 12 and 13, on appeal, obvious. Hence, the rejection of these claims under 35 U.S.C. § 103 has been obviated. Reconsideration and withdrawal thereof are respectfully requested.

(II) Claim 11, on appeal, is patentable, under 35 U.S.C. §103(a) over the combined disclosures of Cramer et al., Berg et al., Lee et al. and Highsmith et al.

Appellants respectfully submit that Claim 11, on appeal, which is ultimately depends on Claim 1, on appeal, is not rendered obvious by the combined disclosures of Cramer et al., Berg et al., Lee et al. and Highsmith et al. Specifically, the combined disclosures of applied references do not teach or suggest a process for producing an insensitive explosive mixture comprising *depositing sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in an amount of less than 15 % by weight onto secondary explosive crystals to form a coating of said TATB on said secondary explosive crystals which binds said secondary explosive crystals.*

With respect to the obviousness rejection citing the combination of Cramer et al., Berg et al., Lee et al. and Highsmith et al., Appellants observe that the combination of Cramer et al., Berg et al., and Lee et al. is defective for the reasons mentioned above. Highsmith et al. does not alleviate the above defects in the combination of applied references since the applied reference also does not teach or suggest Appellants' claimed method which provides a coating of

sonochemically aminated TATB on secondary explosive crystals which binds the secondary explosive crystals.

Highsmith et al. provides a plasticizer that is at least as energetic as nitrate ester-containing plasticizers, but exhibits far superior shock sensitivity and thermal stability than the nitrate ester-containing plasticizers. The plasticizer disclosed in Highsmith et al. is 2,2-dinitro-1,3-propanediol diformate (ADDF). Appellants find no disclosure in Highsmith et al. of the claimed method which provides a coating of TATB onto explosive crystals which serves to bind the crystals together.

Appellants thus submit that the rejection of Claim 11 (which ultimately depends on Claim 1) under 35 U.S.C. § 103 citing the combination of Cramer et al., Berg et al. Lee et al. and Highsmith et al. has been obviated. Reconsideration and withdrawal thereof are respectfully requested.

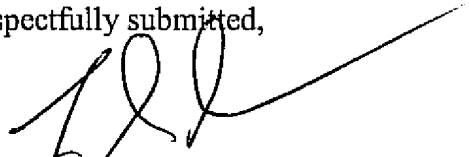
The § 103 rejection also fails because there is no motivation in the applied references which suggest modifying the methods to include the various processing steps and elements recited in the Claim 11 (which is ultimately depends on Claim 1) of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

Appellants again submit that the combined disclosures of Cramer et al., Berg et al., and Highsmith et al. do not render the claimed invention obvious. Hence, the rejection of the

claims under 35 U.S.C. § 103 has been obviated. Reconsideration and withdrawal thereof are respectfully requested.

Thus, in view of the foregoing remarks, it is firmly believed that the Claims 1, 3-7 and 10-13, on appeal, are patentable and are in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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(viii) Claims Appendix

Claim 1 (Previously presented) A process for producing an insensitive explosive mixture comprising depositing sonochemically aminated 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in an amount of less than 15 % by weight onto secondary explosive crystals to form a coating of said TATB on said secondary explosive crystals which binds said secondary explosive crystals.

Claim 2 (Cancelled)

Claim 3 (Original) The process of Claim 1 wherein the secondary explosive crystals are selected from the group consisting of cyclotrimethylenetrinitramine (RDX), cyclotetramethylenetetranitramine (HMX), CL-20 (2,4,6,8,10,12-hexanitrohexaazaisowurzitane, HNIW), PETN (pentaerythritoltetranitrate) and combinations thereof.

Claim 4 (Original) The process of Claim 3 wherein the secondary explosive crystals are HMX crystals.

Claim 5 (Original) The process of Claim 1 wherein the secondary explosive crystals are in an ammonia solution.

Claim 6 (Original) The process of Claim 1 wherein the sonochemically aminated TATB is synthesized from 1,3,5-trichloro-2,4,6-trinitrobenzene (TCTNB) by amination with NH_4OH under the influence of ultrasonic irradiation.

Claim 7 (Original) The process of Claim 1 wherein the sonochemically aminated TATB is produced by dropping a solution of trichlorotrianitrobenzene (TCTNB) in toluene into an ammonia solution that is immiscible with the solution of TCTNB in toluene and reacting the same in the presence of an ultrasonic source.

Claim 8 (Withdrawn) The process of Claim 1 wherein the sonochemically animated TATB is produced in-situ during said depositing step.

Claim 9 (Withdrawn) The process of Claim 1 wherein said in-situ production comprises providing a suspension of said explosive crystals in an aqueous ammonia solution and adding a solution of 1,3,5-trichloro-2,4,6-trinitrobenzene in toluene dropwise.

Claim 10 (Previously Presented) The process of Claim 1 further comprising adding an additional binder to said depositing step.

Claim 11 (Previously Presented) The process of Claim 10 wherein the additional binder comprises a polyacrylic elastomer, a phthalate, calcium stearate, or fumed silica.

Claim 12 (Previously Presented) The process of Claim 1 wherein said sonochemically aminated TATB has a mean particle diameter of 6 to 8 μm.

Claim 13 (Previously Presented) The process of Claim 1 wherein said sonochemical aminated TATB has a mean particle diameter of less than 1 μm.

(ix) Evidence Appendix

Not applicable.

(x) Related Proceedings Appendix

No related appeals, interferences or judicial proceedings have been rendered which are related to, directly affect or would be directly affected by or have a bearing on the Boards decision. Thus, there are no copies of such decisions enclosed.